form into a temporary shape when illuminated with ultraviolet light of a wavelength longer than 260 nm, and may return back to an original shape when illuminated by ultraviolet light of a wavelength shorter than 260 nm.

[0022] In the case of the example depicted in FIG. **2**, in response to activation by agitation light **204**, light-induced shape-memory polymer **206** expands in length. Such length expansion is shown as an example, in that light-induced shape-memory polymer **206** may instead be configured to expand in width (and optionally height). As an example, FIG. **3** depicts such a case, described as follows.

[0023] FIG. **3** shows a light-induced shape-memory polymer **300** of a topography-changing layer in display screen **302**. As depicted, light-induced shape-memory polymer **300** may be separated from other light-induced shape-memory polymers **304** by a material **306**. Material **306** may be configured to contract, to allow for expansion of light-induced shape-memory polymer **300**. In some embodiments, material **306** may be optically matched to light induced shape-memory polymers **304** and **300**.

[0024] As another example, FIG. **4** shows a light-induced shape-memory polymer **400** of a topography-changing layer in display screen **402**. As depicted, light-induced shape-memory polymer **400** may be covered by a transparent cap **404**. Such a transparent cap **404** may have a width d2 that is greater than the width d1 of light-induced shape-memory polymer **400**. Such a configuration may be useful in the case that light-induced shape-memory polymer **400** is not sufficiently transparent. In such a case, the width d1 of light-induced shape-memory polymer **400** may be significantly smaller than the width of a pixel, so that when light-induced shape-memory polymer **400** is placed at a same location as a pixel, at least some of the visible light directed at the pixel is transmitted around the light-induced shape-memory polymer **400**. In other words, reducing the width of light-induced shape-memory polymer **400** increases the amount of light that will reach the viewer. Accordingly, display screen **402** may still present visible images without having to significantly increase the intensity of the visible light projected by the projection/imaging system. By covering light-induced shape-memory polymer **400** with a transparent cap **404**, an area having width d2 will be adjusted in the topography-changing layer of display screen **402** via expansion of light-induced shape-memory polymer **400**. Such an area may be of a similar size to that of a pixel, although other sizes are within the spirit of this disclosure.

[0025] FIG. **5** schematically shows an example of a user **500** interacting with a display screen **502** having a topography-changing layer. In response to agitation light, light-induced shape-memory polymers of the topography-changing layer have elongated so as to elevate a region **504** having a substantially button-shaped form factor. Region **504** may, for example, be part of a user interface displayed on display screen **502**. For example, an image in the shape of a button may be projected onto region **504** so that a button is visible to user **500** at region **504**. Further, the raised topography of region **504** may provide a tactile reinforcement that region **504** is currently serving as a virtual button. Finally, a user touch directed to region **504** may be detected, for example as described above, thus allowing the region **504** to provide working button functionality.

[0026] As shown in an expanded view, user **500** may touch a pixel region **506** of several pixels. As described above, by having a light-induced shape-memory polymer located at each pixel location and individually addressable by agitation light, elongation of individual light-induced shape-memory polymers may be controlled so as to yield distinct topographies on the topography-changing layer. In this way, virtual buttons or any other tactile element may be dynamically formed on the display screen **502**.

[0027] FIG. **6** shows a schematic depiction of an embodiment of an interactive display device in the form of a surface computing system **610**. The surface computing system **610** comprises a projection display system having an image source **612**, and a display screen **614** onto which images are projected. Image source **612** may be a rear projector that can project images onto display screen **614**. Image source **612** may comprise a light source **616**, such as the depicted wideband source arc lamp **616**, a plurality of LEDs configured to emit light of three colors (e.g. three primary colors), and/or any other suitable light source. Image source **612** may also comprise an image-producing element **618**, such as the depicted LCD (liquid crystal display), an LCOS (liquid crystal on silicon) display, a DLP (digital light processing) display, or any other suitable image-producing element. Image source **612** may be configured to interact with a logic subsystem **624** and/or a data-holding subsystem **626**, as described hereafter, to perform functions of an imaging engine, such as imaging engine **104** shown in FIG. **1**.

[0028] Display screen **614** may include a clear, transparent portion **620**, such as a sheet of glass, and a diffuser, referred to herein as diffuser screen layer **622**, disposed over the clear, transparent portion **620**. In this way, transparent portion **620** and diffuser screen layer **622** can form a non-limiting example of a touch-sensitive region of display screen **614**. It will be understood that the diffuser screen layer may either be a separate part from the clear, transparent portion **620**, or may be formed in a surface of, or otherwise integrated with, the clear, transparent portion **620**. Display screen **614** may further include a topography-changing layer configured to change in topography in response to external stimuli. As described above with reference to display screen **102** shown in FIG. **1**, the topography-changing layer may include light-induced shape-memory polymers as described herein.

[0029] Surface computing system **610** may further include an agitation light **623**, configured to project agitation light of an ultraviolet band (i.e., an external stimuli) towards the display screen. Agitation light **623** may be modulated at a pixel level to selectively change the topography of the topography-changing layer.

[0030] Continuing with FIG. **6**, surface computing system **610** may further includes a logic subsystem **624** and data-holding subsystem **626** operatively coupled to the logic subsystem **624**. Logic subsystem **624** may be further configured to execute instructions on data-holding subsystem **626** operate agitation light **623**, as described above with reference to topography-changing engine **112** of FIG. **1**. The surface computing system **610** may include a user input device **627**, such as a wireless transmitter and receiver configured to communicate with other devices.

[0031] To sense objects that are contacting or near to display screen **614**, surface computing system **610** may include one or more image capture devices (e.g., sensor **628**, sensor **630**, sensor **632**, sensor **634**, and sensor **636**) configured to capture an image of the backside of display screen **614**, and to provide the image to logic subsystem **624**. Accordingly, the image capture devices and logic subsystem **624** may serve as a touch-detection engine, such as touch-detection engine **110**